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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,052

03/09/2005

Shin Horiuchi

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EXAMINER

BURKHART, ELIZABETH A

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

08/18/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,052	Applicant(s) HORIUCHI, SHIN	
	Examiner ELIZABETH A. BURKHART	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/19/07, 12/16/05, 3/9/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, Claims 1-7 and 9 in the reply filed on 6/19/2008 is acknowledged. Claim 8 is withdrawn from further consideration as being drawn to a nonelected invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Hanus et al.

Hanus teaches a process for producing a poly(methyl methacrylate) (PMMA)-metal cluster composite, which comprises bringing PMMA into contact with a heavy metal compound under ultraviolet irradiation. The heavy metal compound is copper acetylacetonate (CuAcAc) (Abstract, p. 320).

Thus, Hanus describes every limitation of claims 1 and 3 and thus anticipates the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakao in view of Beauvois et al and Hanus et al.

Nakao teaches a process for producing a PMMA-Pd metal cluster composite which comprises bringing PMMA (sheet) into contact with vapor of a heavy metal compound while heating. The heavy metal compound may be an acetylacetonate complex of palladium, platinum, or copper (p. 766-767).

Nakao does not teach contacting PMMA with the vapor of the heavy metal compound under ultraviolet radiation.

Beauvois teaches irradiating PMMA-copper acetylacetonate composite films with ultraviolet radiation to decompose the copper acetylacetonate to form copper within the film. Beauvois also teaches that decomposition of the copper acetylacetonate may be performed by heating or by direct energy beam (i.e. UV) (Abstract, p. 167).

Hanus teaches that a PMMA-metal cluster composite may be formed by decomposing CuAcAc by UV irradiation (Abstract, p. 320).

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It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to decompose the metal acetylacetonate complex in the process of Nakao by ultraviolet radiation as suggested by Beauvois as an alternative to decomposing the complex by heating since both methods would be expected to successfully form a PMMA-metal cluster composite as evidenced by Hanus. Also, Nakao teaches that the formation of Pd clusters in PMMA by heating took several hours (p. 766) while the decomposition of the CuAcAc in Beauvois by UV irradiation took several 30 ns pulses (p. 168-169). Thus, it would have been obvious to one of ordinary skill in the art to use UV irradiation in the process of Nakao in order to form metal clusters more quickly.

Regarding Claim 4, Nakao teaches the PMMA sheet is brought into contact with the heavy metal compound vapor in a non-oxidizing atmosphere (nitrogen) (p. 766).

Regarding Claim 5, Nakao teaches the PMMA sheet is brought into contact with the heavy metal compound vapor at a temperature (180°C) above the glass transition temperature of the PMMA sheet (105°C) (p. 766).

Regarding Claim 6, Hanus teaches that the metal nanoclusters may be formed in a predetermined pattern (p. 320).

Thus, claims 1-6 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Nakao, Beauvois, and Hanus.

4. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakao in view of Beauvois et al and Hanus et al as applied above and further in view of Zhang et al.

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Nakao, Beauvois, and Hanus do not teach forming a predetermined pattern by masking.

Zhang teaches selectively decomposing platinum acetylacetonate using UV radiation (excimer lamp) wherein a mask is employed to form a desired pattern of platinum on the substrate (p. 996).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use a mask as suggested by Zhang in the process of Beauvois and Hanus in order to selectively decompose the metal acetylacetonate complex to form metal clusters in a desired pattern.

Thus, claims 7 and 9 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Nakao, Beauvois, Hanus, and Zhang.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELIZABETH A. BURKHART whose telephone number is (571)272-6647. The examiner can normally be reached on M-Th 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Elizabeth A Burkhardt/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792